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## (54) MOLDED VESSEL AND PREPARATION THEREOF

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a vessel which does not generate particles in a semiconductor treating chemical, even when storing or transporting a semiconductor treating chemical, and a preparation process thereof.

**SOLUTION:** In a molded vessel, at least the inner side of the vessel is prepared by blow molding an alicyclic structure-containing polymer resin material. When the vessel is filled with at least one aqueous solution chosen from the group consisting of an acidic aqueous solution having a pH of 3 or below, an alkaline aqueous solution having a pH of 10 or above and oxygenated water, and is left still for 24 hours at 23°C, the amount of generated particles of 0.2 µm or larger is 0.5 counts/ml or less per 1 cm<sup>2</sup> inner surface area of the part of the vessel contacting the aqueous solution.

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CLAIMS

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[Claim(s)]

[Claim 1] It is the thing to which an inside of a container comes to carry out blow molding of the alicyclic structure content polymer resin material at least. And a case where a container is filled up with with a pH of three or less aqueous acids, a with a pH of ten or more alkaline aqueous solution, and at least one sort of aqueous solutions chosen from a group which consists of hydrogen peroxide solution, A shaping container whose particle yield of 0.2 micrometers or more under 23-degree-C environment and 24-hour standing conditions is 0.5 counts(es)/less than ml per two 1cm of internal-surface products which a container and an aqueous solution contact.

[Claim 2] A blow molding container according to claim 1 whose container is an object for semiconductor manufacture for drug solutions.

[Claim 3] A shaping container according to claim 1 or 2 whose amount of antioxidants contained in an alicyclic structure content polymer resin material is the range of the 0.0001 weight sections - 0.01 weight section to the alicyclic structure content polymer resin material 100 weight section.

[Claim 4] A manufacture method of a shaping container characterized by including a production process which sets to 150 ppm or less a volatile-matter residue which may volatilize below with glass transition temperature of this alicyclic structure polymer resin in an alicyclic structure content polymer resin material, and a production process which carries out blow molding of this material after that.

[Claim 5] A manufacture method according to claim 4 that production processes which set a volatile-matter residue to 150 ppm or less are heat-treatment and/or reduced pressure processing.

[Claim 6] A manufacture method according to claim 4 or 5 that the amount of antioxidants is the 0.0001 weight sections - 0.01 weight section to this alicyclic structure content polymer resin 100 weight section in an alicyclic structure content polymer resin material, including an antioxidant.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

#### [0001]

[The technical field to which invention belongs] About the suitable container for semiconductor processing drug solutions, and its manufacture method, in detail, even if it contacts this invention in with a pH of three or less aqueous acids, a with a pH of ten or more alkaline aqueous solution, or aqueous solutions, such as hydrogen peroxide solution, it relates to the container with few yields and its manufacture method of particle.

#### [0002]

[Description of the Prior Art] In the semiconductor manufacturing process, in order to process a silicon wafer, strong drug solutions, such as strong acid, such as a sulfuric acid, a nitric acid, fluoric acid, and a hydrochloric acid, strong bases, such as aqueous ammonia, and peroxides, such as hydrogen peroxide solution, are used as processing liquid. Since the advanced detailed processing on a semiconductor is called for and the particle in a semiconductor processing drug solution becomes the detailed cause of defective of a semiconductor every year as the degree of integration of a semiconductor goes up, the semiconductor processing drug solution which made this particle content very low is called for. Therefore, the container which holds a semiconductor processing drug solution and is conveyed is also contacted to a semiconductor processing drug solution, and what does not generate particle is demanded.

[0003] On the other hand, the container using an alicyclic structure content polymer resin material is reported. For example, the container which injection molded the molding material which contained the antioxidant 0.05 weight section in the norbornene system polymer 100 weight section is indicated by JP,5-317411,A. Although the container obtained by this method is excellent in points, like there is little elution of an impurity and there is little adsorption to the vessel-wall side of a drug effect component when it is used for example, for a drugs container etc. It is not that from which the engine performance satisfactory enough as a container used by the semiconductor manufacturing process as which generating of a more detailed impurity is made into a problem, and an advanced air cleanliness class is required is obtained. Under the effect of the shaping method of a container, the compounding agent of a process condition and the resin material to be used, etc. When semiconductor processing drug solutions, such as peroxides, such as with a pH of three or less aqueous acids, a with a pH of ten or more alkaline aqueous solution, or hydrogen peroxide solution, were made to keep and convey, the problem that particle occurred so much had arisen.

#### [0004]

[Problem(s) to be Solved by the Invention] The purpose of this invention is to offer the container which particle does not generate in a processing drug solution, and its manufacture method, also when a semiconductor processing drug solution is storage-stored and is made to convey.

#### [0005]

[Means for Solving the Problem] a result of having repeated research wholeheartedly this invention persons solving a trouble of said conventional technology -- 1 -- a container with which it becomes, and an inside carries out blow molding and is acquired from an alicyclic structure content polymer resin material at least Since it excels in the smooth nature of the inside etc., even if it keeps or conveys semiconductor drug solutions, such as strong acid, a strong base, or hydrogen peroxide solution that generating of particle is fully pressed down, and 2 -- an addition of an antioxidant in the

alicyclic structure content polymer material. By using a container which reduced and carried out blow molding to the 0.0001 weight sections - 0.01 weight section and the degree of pole to the alicyclic structure content polymer resin 100 weight section. To that generating of particle is furthermore suppressed, and a pan, a 3 alicyclic structures content polymer resin material. Before blow molding, heat-treat below with glass transition temperature (it abbreviates to Tg henceforth) of \*\* alicyclic structure content polymer resin. or \*\* -- the smooth nature of a blow molding body surface fabricated could be raised by performing reduced pressure processing below by Tg similarly, and reducing a volatile component, and it found out that an effect that this suppresses particle generating further was seen etc. This invention comes to be completed based on these knowledge.

[0006] According to this invention, it is the thing to which an inside of a container comes to carry out blow molding of the alicyclic structure content polymer resin material at least in this way. And a case where a container is filled up with with a pH of three or less aqueous acids, a with a pH of ten or more alkaline aqueous solution, and at least one sort of aqueous solutions chosen from a group which consists of hydrogen peroxide solution, A shaping container whose particle yield of 0.2 micrometers or more under 23-degree-C environment and 24-hour standing conditions is 0.5 counts (es)/less than ml per two 1cm of internal-surface products which a container and an aqueous solution contact is offered. According to this invention, a manufacture method of a shaping container characterized by including a production process which sets a volatile-matter residue in an alicyclic structure content polymer resin material to 150 ppm or less, and a production process which carries out blow molding of this material after that is offered.

[0007]

[Embodiment of the Invention] Below, it divides into an item and the gestalt of desirable operation of this invention is explained.

[0008] As alicyclic structure content polymer resin used by alicyclic structure content polymer resin material this invention, the thing containing alicyclic structure content polymer resin is used.

Although there will be no exceptional limit if alicyclic structure content polymer resin has alicyclic structure in a principal chain and/or a side chain, what contains alicyclic structure in a principal chain from a viewpoint of a mechanical strength, thermal resistance, a Plastic solid, etc. is desirable.

[0009] As alicyclic structure, although cycloparaffine (cycloalkane) structure, partial saturation cyclic-hydrocarbon (cycloalkene) structure, etc. are mentioned, viewpoints, such as a mechanical strength and thermal resistance, to cycloalkane structure is desirable. 4-30 pieces, although there is no limit with the exceptional carbon atomic number which constitutes alicyclic structure, when it is 5-15 ranges more preferably, a mechanical strength, thermal resistance, and the property of a moldability balance to altitude, and it is usually preferably suitable [ property ] for it 5-20 pieces.

[0010] Although the rate of a repeat unit of having the alicyclic structure in alicyclic structure content polymer resin should just be suitably chosen according to the purpose of use, it is 50 % of the weight or more usually 90 % of the weight or more more preferably 70% of the weight or more. If there are too few rates of a repeat unit of having the alicyclic structure in alicyclic structure content polymer resin, it is not inferior [ thermal resistance ], and desirable. In addition, there is no limitation with the exceptional remainders other than the repeat unit which has the alicyclic structure in alicyclic structure content polymer resin, and it is suitably chosen according to the purpose of use.

[0011] As an example of the polymer resin containing such alicyclic structure, (1) norbornene system polymer, the annular olefin system polymer of (2) monocycles, (3) annular conjugated diene system polymer, (4) vinyl alicyclic hydrocarbon system polymers, these hydrogenation objects, etc. are mentioned, for example. Also in these, from a viewpoint of a mechanical strength, thermal stability, and a moldability, a norbornene system polymer and its hydrogenation object, an annular conjugated diene system polymer, its hydrogenation object, etc. are desirable, and a norbornene system polymer and its hydrogenation object are more desirable.

[0012] (1) The norbornene system polymer used for norbornene system polymer this invention is a well-known polymer currently indicated by JP,3-14882,A, JP,3-122137,A, etc., and, specifically, the ring-opening-polymerization object of a norbornene system monomer and its hydrogenation object, the addition polymer of a norbornene system monomer, the addition mold copolymer of a norbornene system monomer and the monomer of others which can be copolymerized, etc. are mentioned. Also in these, when making thermal resistance and chemical resistance balance to

altitude, the ring-opening-polymerization object and its hydrogenation object of a norbornene system monomer are desirable, and especially the ring-opening-polymerization object hydrogenation object of a norbornene system monomer is desirable.

[0013] As a norbornene system monomer, a bicyclo [2, 2, 1]-hept-2-en (trivial name: norbornene), A 5-methyl-bicyclo [2, 2, 1]-hept-2-en, 5, and 5-dimethyl-bicyclo [2, 2, 1]-hept-2-en, A 5-ethyl-bicyclo [2, 2, 1]-hept-2-en, a 5-butyl-bicyclo [2, 2, 1]-hept-2-en, A 5-hexyl-bicyclo [2, 2, 1]-hept-2-en, a 5-octyl-bicyclo [2, 2, 1]-hept-2-en, A 5-octadecyl-bicyclo [2, 2, 1]-hept-2-en, a 5-ethylidene-bicyclo [2, 2, 1]-hept-2-en, A 5-methylidyne-bicyclo [2, 2, 1]-hept-2-en, a 5-vinyl-bicyclo [2, 2, 1]-hept-2-en, A 5-cyano-bicyclo [2, 2, 1]-hept-2-en, 5-methyl - 5-methoxycarbonyl-bicyclo [2, 2, 1]-hept-2-en, A 5-methoxycarbonyl-bicyclo [2, 2, 1]-hept-2-en, A 5-ethoxycarbonyl-bicyclo [2, 2, 1]-hept-2-en, 5-methyl - 5-ethoxycarbonyl-bicyclo [2, 2, 1]-hept-2-en, Bicyclo [2, 2, 1]-hept-5-enyl-2-methylpropionate; Bicyclo [2, 2, 1]-hept-5-enyl-2-methyl OKUTANEITO, The bicyclo [2, 2, 1]-hept-2-en -5, 6-dicarboxylic acid anhydride, A 5-hydroxymethyl-bicyclo [2, 2, 1]-hept-2-en, 5, a 6-JI (hydroxymethyl)-bicyclo [2, 2, 1]-hept-2-en, 5-hydroxy - i-propyl-bicyclo [2, 2, 1]-hept-2-en, A bicyclo [2, 2, 1]-hept-2-en, 5, a 6-dicarboxy-bicyclo [2, 2, 1]-hept-2-en, The bicyclo [2, 2, 1]-hept-2-en -5, 6-dicarboxylic acid imide, A 5-cyclopentyl-bicyclo [2, 2, 1]-hept-2-en, A 5-cyclohexyl-bicyclo [2, 2, 1]-hept-2-en, a 5-cyclohexenyl-bicyclo [2, 2, 1]-hept-2-en, a 5-phenyl-bicyclo [2, 2, 1]-hept-2-en, [0014] The tricyclo [4, 3, 12, 5, 01, 6]-deca -3, 7-diene (trivial name dicyclopentadiene), A tricyclo [4, 3, 12, 5, 01, 6]-deca-3-en, tricyclo [4, 4, 12, 5, 01, 6]-undeca -3, 7-diene, Tricyclo [4, 4, 12, 5, 01, 6]-undeca -3, 8-diene, A tricyclo [4, 4, 12, 5, 01, 6]-undeca-3-en, Tetracyclo [7, 4, 110, 13, 01, 9, 02, 7]-trideca - 2, 4, 6-11-tetraene (1, 4-methano - it is also called 1, 4, 4a, and a 9a-tetrahydro fluorene), Tetracyclo [8, 4, 111, 14, 01, 10, 03, 8]-tetra-deca - 3, 5, 7, 12-11-tetraene (1, 4-methano - it is also called a 1, 4, a [ 4 ], 5, 10, and 10a-hexahydro anthracene), [0015] A tetracyclo [4, 4, 12, 5, 17, 10, 0]-dodeca-3-en (it is also only called tetracyclo dodecen), A 8-methyl-tetracyclo [4, 4, 12, 5, 17, 10, 0]-dodeca-3-en, A 8-ethyl-tetracyclo [4, 4, 12, 5, 17, 10, 0]-dodeca-3-en, A 8-ethylidene-tetracyclo [4, 4, 12, 5, 17, 10, 0]-dodeca-3-en, A 8-ethoxycarbonyl-tetracyclo [4, 4, 12, 5, 17, 10, 0]-dodeca-3-en, 8-methyl - 8-methoxycarbonyl-tetracyclo [4, 4, 12, 5, 17, 10, 0]-dodeca-3-en, A 8-hydroxymethyl-tetracyclo [4, 4, 12, 5, 17, 10, 0]-dodeca-3-en, A 8-carboxy-tetracyclo [4, 4, 12, 5, 17, 10, 0]-dodeca-3-en, A 8-cyclopentyl-tetracyclo [4, 4, 12, 5, 17, 10, 0]-dodeca-3-en, A 8-cyclohexenyl-tetracyclo [4, 4, 12, 5, 17, 10, 0]-dodeca-3-en, A 8-phenyl-tetracyclo [4, 4, 12, 5, 17, 10, 0]-dodeca-3-en, Norbornene system monomers, such as PENTA cyclo [6, 5, 11, 8, 13, 6, 02, 7, 09, 13]-pen TADEKA -3, 10-diene, PENTA cyclo [7, 4, 13, 6, 110, 13, 01, 9, 02, 7]-pen TADEKA -4, and 11-diene, etc. are mentioned. These norbornene system monomers are independent, respectively, or are combined two or more sorts and used.

[0016] Under ring-opening-polymerization object catalyst existence, the ring-opening-polymerization object of these norbornene system monomer can carry out the polymerization of the above-mentioned norbornene system monomer, and can obtain it. The catalyst system which consists of the halogenide of metals, such as the catalyst system which consists of the halogenide of metals, such as a ruthenium, a rhodium, palladium, an osmium, iridium, and platinum, a nitrate or an acetylacetone compound, and a reducing agent, for example or titanium, vanadium, a zirconium, a tungsten, and molybdenum, or an acetylacetone compound, and an organoaluminium compound as a ring-opening-polymerization catalyst is used. A polymerization reaction is the inside of a solvent, or a non-solvent, and is usually performed by the polymerization temperature of -50 degrees C - 100 degrees C, and the 0-50kg/cm<sup>2</sup> polymerization pressure force. The hydrogenation object of a norbornene system polymer can be obtained by the method of usually hydrogenating the ring-opening-polymerization object of the above-mentioned norbornene system monomer by hydrogen under existence of catalysts for hydrogenation.

[0017] The ring-opening-polymerization object hydrogenation object of a norbornene system monomer can usually be obtained by adding catalysts for hydrogenation in the polymerization solution of the ring-opening-polymerization object of the above-mentioned norbornene system

monomer, and hydrogenating it. Especially as catalysts for hydrogenation, although not limited, a heterogeneous catalyst and a homogeneous catalyst are usually used. The solid-state catalyst which, for example, made support, such as carbon, a silica, the diatom earth, an alumina, and titanium oxide, support nickel, palladium, platinum, or these metals as a heterogeneous catalyst: Nickel/silica, nickel/diatom earth, nickel/alumina, palladium/carbon, palladium/silica, palladium/diatom earth, palladium/alumina, etc. are mentioned. The catalyst which consists of combination of a transition-metals compound, an alkyl aluminum gold group compound, or alkyl lithium as a homogeneous catalyst, for example, For example, cobaltous acetate/triethylaluminum, cobaltous acetate/triisobutylaluminum, Nickel acetate/triethylaluminum, nickel acetate/triisobutylaluminum, The catalyst which consists of combination of nickel acetylacetato / triethylaluminum, nickel acetylacetato / TORIISO butyl aluminum NIUIMU, titanocene chloride / n-butyl lithium, zirconocene chloride / n-butyl lithium, etc., etc. is mentioned. These catalysts for hydrogenation are independent, respectively, or can be combined two or more sorts and can be used. the amount of the catalysts for hydrogenation used -- per ring-opening-polymerization object 100 weight section of a norbornene system monomer -- usually -- the 0.01 - 100 weight section -- desirable -- 0.1 - 50 weight section -- it is the range of 1 - 30 weight section more preferably. A hydrogenation reaction is usually 1-150kg/cm<sup>2</sup>. It is carried out under hydrogen pressure by the temperature requirement of 0-250-degreeC, and the reaction time of 1 hour - 20 hours.

[0018] The addition (\*\*) polymer of a norbornene system monomer or a norbornene system monomer, and the monomer of others which can be copolymerized is the inside of a solvent, or a non-solvent, and can usually obtain for example, a monomer component by the method of carrying out a polymerization (\*\*) by the polymerization temperature of -50 degrees C - 100 degrees C, and the 0-50kg/cm<sup>2</sup> polymerization pressure force under existence of the catalyst system which consists of titanium, a zirconium or a vanadium compound, and an organoaluminium compound.

[0019] in addition, as a monomer of others which can be copolymerized If a norbornene system monomer and copolymerization are possible, there will be no exceptional limit. For example, ethylene, a propylene, 1-butene, 1-pentene, 1-hexene, A 3-methyl-1-butene, 3-methyl-1-pentene, 3-ethyl-1-pentene, A 4-methyl-1-pentene, 4-methyl-1-hexene, 4, and 4-dimethyl-1-hexene, 4 and 4-dimethyl-1-pentene, a 4-ethyl-1-hexene, a 3-ethyl-1-hexene, 1-octene, 1-decene, 1-dodecen, 1-tetradecene, 1-hexadecene, The ethylene or the alpha olefins of carbon numbers 2-20, such as 1-octadecene and 1-ray KOSEN; Cyclobutene, Cyclopentene, a cyclohexene, 3, 4-dimethyl cyclopentene, 3-methyl cyclohexene, a 2-(2-methylbutyl)-1-cyclohexene, Cycloolefins, such as a cyclooctane, a [ 3 ], 5 and 6, 7a-tetrahydro-4, and 7-methano-1H-indene; 1, 4-hexadiene, Nonconjugated diene [, such as 4-methyl -1, 4-hexadiene, 5-methyl -1, 4-hexadiene, 1 and 7-OKUTA diene, ]; etc. is used. Also in these, ethylene or an alpha olefin is desirable. The monomer of others in which these copolymerization is possible is independent, respectively, or can be used combining two or more sorts. a rate with the joint unit of the other monomer origins in which the joint unit of the norbornene system monomer origin in an addition copolymer and copolymerization are possible when carrying out addition copolymerization of a norbornene system monomer and the monomer of others which can be copolymerized -- a weight ratio -- usually -- 30:70-99:1 -- desirable -- 50:50-97:3 -- it is suitably chosen so that it may become the range of 70:30-95:5 more preferably.

[0020] (2) As an annular olefin system polymer of the annular olefin system polymer monocycle of a monocyte, the addition polymer of the annular olefin system monomer of monocytes, such as a cyclohexene currently indicated by JP,64-66216,A, a cyclo heptene, and cyclooctane, can be used, for example.

[0021] (3) As an annular conjugated diene system polymer annular conjugated diene system polymer, it is 1 and 2-, or 1 and 4 about annular conjugated diene system monomers currently indicated by JP,6-136057,A and JP,7-258318,A, such as a cyclopentadiene and cyclohexadiene, for example. - The polymer which carried out addition polymerization, its hydrogenation object, etc. can be used.

[0022] (4) The hydrogenation object of the ring portion of the polymer of vinyl aromatic series system monomers, such as styrene and alpha methyl styrene, currently indicated by the polymer of vinyl alicyclic hydrocarbon system monomers, such as a vinyl cyclohexene currently indicated by JP,51-59989,A and a vinyl cyclohexane, and its hydrogenation object, JP,63-43910,A, JP,64-1706,A,

etc., for example as a vinyl alicyclic hydrocarbon system polymer vinyl alicyclic hydrocarbon system polymer can be used.

[0023] Although the molecular weight of the alicyclic structure content polymer resin used by this invention is suitably chosen according to the purpose of use It is the weight average molecular weight of the polyisoprene measured with the gel permeation chromatography of a cyclohexane solution (it is a toluene solution when polymer resin does not dissolve), or polystyrene conversion. 5,000-500,000 -- 8,000-200,000, and when it is the range of 10,000-100,000 more preferably, mechanical strengths, such as the pressure resistance of a container and shatter strength, and fabrication nature balance to altitude, and are preferably suitable. [ usually, ]

[0024] 70 degrees C or more, although Tg of the alicyclic structure content polymer resin used by this invention should just be suitably chosen according to the purpose of use, when it is the range of 100 degrees C - 200 degrees C more preferably, thermal resistance and fabrication nature balance to altitude, and it is usually preferably suitable [ nature ] for it 90 degrees C - 250 degrees C.

[0025] JIS in 280 degrees C of the alicyclic structure content polymer resin used by this invention, and load 2.16kgf although what is necessary is just to choose suitably the melt flow rate measured by K6719 according to the purpose of use -- usually -- 0.1-100g/10min. -- the range of 1-50g / 10min. is preferably suitable. When a melt flow rate is in this range, a low dental-curing form becomes possible, and poor shaping, such as drawdown at the time of shaping, can be reduced, and it is suitable.

[0026] These alicyclic structure content polymer resin is independent, respectively, or can be used combining two or more sorts. Although the rate of the alicyclic structure content polymer resin in an alicyclic structure content polymer resin material is suitably chosen by the purpose of use, it is 50 % of the weight or more usually 70 - 100% of the weight of a range more preferably 60 to 100% of the weight.

[0027] The alicyclic structure content polymer resin material used for this invention can blend other components if needed in addition to the above-mentioned alicyclic structure content polymer resin. As other components, other polymer, an antioxidant, other compounding agents, etc. are mentioned. Other resin, elasticity polymers, etc. are mentioned as other polymer.

[0028] As other resin, a polyvinyl chloride, polymethylmethacrylate, Polystyrene, a polymethylmethacrylate styrene copolymer, a polyacrylonitrile, A polyacrylonitrile styrene copolymer, high impact polystyrene (HIPS), An AKURIRONI torr styrene-butadiene-rubber copolymer (ABS plastics), a polycarbonate, Non-crystalline polymers, such as polyarylate, Pori Sall John, a polyether ape phone, and polyphenylene ether; High density polyethylene, Low density polyethylene, linear low density polyethylene, polypropylene, Chain-like polyolefine system polymers, such as polypropylene, polypropylene, the poly methyl pentene, and ultra high molecular weight polyethylene, Polyethylene terephthalate, polybutylene terephthalate, polyethylenenaphthalate, Polyamide system polymers, such as polyester system polymers, such as aromatic polyester, nylon 6, Nylon 66, Nylon 12, and polyamidoimide, Vinyl system polymers, such as polyvinyl alcohol and a polyvinylidene chloride, Fluorine system polymers, such as polyvinylidene fluoride and polytetrafluoroethylene, Crystalline polymer; by which a crystalline melting point is observed by heat measurement of a polyacrylonitrile, syndiotactic polystyrene, polyoxymethylene, polyphenylene sulfide, a polyether ether ketone, a liquid crystal polymer, etc. is mentioned.

[0029] As an elasticity polymer, it is the polymer which usually has Tg 30 degrees C or less, and, also in the case of the polymer with which two or more Tg(s) exist, or the polymer which has both Tg and the melting point (Tm), lowest Tg is contained as this elasticity polymer that is 30 degrees C or less. The olefin system elasticity polymer which mainly consists of (a) ethylene and alpha olefins, such as a propylene, as such an elasticity polymer, (b) The isobutylene system elasticity polymer, the (c) butadiene which mainly consist of an isobutylene, The diene system elasticity polymer which mainly consists of conjugated dienes, such as an isoprene, (d) Norbornene which does not correspond to the alicyclic structure content polymer of this invention, The annular olefin system ring-opening-polymerization object which mainly consists of annular olefins, such as cyclopentene, (e) The elasticity polymer which makes silicon-oxygen association a frame (organic polysiloxane), (f) alpha, the elasticity polymer which mainly consists of a beta-partial saturation acid and its

derivative, (g) The elasticity polymer of the elasticity polymer which mainly consists of unsaturated alcohol and an amine, its acyl derivative, or an acetal, the polymer of the (h) epoxy compound, (i) fluorine system rubber, and (j) and others etc. is mentioned.

[0030] As an example of these elasticity polymers, they are homopolymers, such as liquefied polyethylene, atactic polypropylene, 1-butene, a 4-methyl-1-butene, 1-hexene, 1-octene, and 1-decene, for example as (a); Copolymers, such as ethylene and an alpha olefin copolymer, a propylene and an alpha olefin copolymer, an ethylene propylene diene copolymer (EPDM), ethylene and an annular olefine copolymer, and an ethylene propylene styrene copolymer, are mentioned. As (b), a polyisobutylene, isobutylene polyisoprene rubber, an isobutylene styrene copolymer, etc. are mentioned. As (c), it is the homopolymer of conjugated dienes, such as polybutadiene and polyisoprene.; Butadiene styrene random copolymer, An isoprene styrene random copolymer, an acrylonitrile butadiene copolymer, Random copolymer of conjugated dienes, such as a hydrogenation object of an acrylonitrile butadiene copolymer, and acrylonitrile-butadiene-styrene copolymer; Styrene-butadiene-rubber block copolymer, The block copolymers of conjugated dienes, such as a styrene styrene-butadiene-rubber block copolymer, an isoprene styrene block copolymer, and a styrene isoprene styrene block copolymer, and an aromatic series vinyl system hydrocarbon, these hydrogenation objects, etc. are mentioned. As (d), the metathesis ring-opening-polymerization object and its hydrogenation objects of a mono-annular olefin, such as norbornene system monomers, such as norbornene, vinyl norbornene, and ethylidene norbornene, or cyclobutene, cyclopentene, and cyclooctane, are mentioned. As (e), silicone rubber, such as dimethylpolysiloxane, a diphenyl polysiloxane, and a dihydroxy polysiloxane, etc. is mentioned.

[0031] As (f), it is the homopolymer of acrylic monomers, such as poly butyl acrylate, poly butyl methacrylate, polyhydroxyethyl methacrylate, polyacrylamide, and a polyacrylonitrile.; The copolymer of acrylic monomers, such as a butyl acrylate styrene copolymer, and other monomers is mentioned. As (g), it is the homopolymer of unsaturated alcohol (esterification), such as polyvinyl alcohol, polyvinyl acetate, Pori stearin acid vinyl, Pori benzoic-acid vinyl, and polymer lane acid vinyl.; The copolymer of unsaturated alcohol (esterification), such as a vinyl acetate styrene copolymer, and other monomers etc. is mentioned. As (h), polyethylene oxide, polypropylene oxide, epichlorohydrin rubber, etc. are mentioned. As (i), vinylidene fluoride system rubber, tetrafluoroethylene-propylene rubber, etc. are mentioned. As (j), natural rubber, a polypeptide, protein and thermoplastic elastomer polyester given in JP,8-73709,A, vinyl chloride system thermoplastic elastomer, thermoplastic elastomer polyamide, etc. are mentioned. These elasticity polymers may have the structure of cross linkage, and may introduce a functional group by denaturation.

[0032] Also in the above-mentioned elasticity polymer, the elasticity polymer of (a), (b), and (c), and since the hydrogenation object of the diene system elasticity polymer of (c) and the diene system elasticity polymer with which hydrogenation of the carbon-carbon unsaturated bond of a conjugated diene joint unit was carried out still more preferably is excellent in rubber elasticity and especially more preferably excellent in mechanical strength, flexibility, and dispersibility, it is desirable. As a desirable example of a diene system polymer, it is the hydrogenation object of random copolymers, such as a hydrogenation object of homopolymers, such as polybutadiene, and Butadiene Styrene.; Hydrogenation object [ of block copolymers, such as a styrene-butadiene-rubber block copolymer, styrene styrene-butadiene-rubber block copolymerization, an isoprene styrene block copolymer, and a styrene isoprene styrene block copolymer, ]; etc. is mentioned. The polymer of these others is independent, respectively, or is used combining two or more sorts. The loadings of the polymer of these others in an alicyclic structure content polymer resin material are suitably chosen as the range which does not spoil the purpose of this invention, and are less than 50 % of the weight usually 10 or less % of the weight more preferably 30 or less % of the weight.

[0033] A Plastic solid with still less particle can be acquired by blending the anti-oxidant of the amount of specification in this invention. Although there is no exceptional limit as an antioxidant, since a phenolic antioxidant, the Lynn system antioxidant and a thioether system antioxidant, and a lactone system antioxidant are mentioned and elution-proof nature [ as opposed to the thermal resistance of mold goods and a contact liquid in especially a phenolic antioxidant ] is excellent for example, it is desirable.

[0034] As a phenolic antioxidant, a well-known thing can be used conventionally. For example, 2-tertiary butyl-6-(3-tertiary butyl-2-hydroxy-5-methylbenzyl)-4-methylphenyl acrylate, 2, 3rd amyl [ of 4-G ]-6- The acrylate system phenolic compound indicated by JP,63-179953,A and JP,1-168643,A, such as phenyl acrylate; 2, 6-G tertiary butyl-4-methyl phenol, (1-(3, 3rd amyl [ of 5-G ]-2-hydroxyphenyl) ethyl) 2, 6-G tertiary butyl-4-ethylphenol, octadecyl-3-(3, 5-G tertiary butyl-4-hydroxyphenyl) propionate, 2 and 2'-methylenebis (the 4-methyl-6-3rd butylphenol), 4 and 4'-butylidenebis (6-tertiary butyl-m-cresol), A 4 and 4'-thio screw (the 3-methyl-6-3rd butylphenol), screw (3-cyclohexyl-2-hydroxy-5-methylphenyl) methane, 3, 9-screw (2-(3-(3-tertiary butyl-4-hydroxy-5-methylphenyl) propionyloxy)-1 and 1-dimethyl ethyl)-tetraoxaspiro [ 2, 4, 8, and 10-] [5, 5] undecane, 1, 1, 3-tris (the 2-methyl-4-hydroxy-5-3rd butylphenyl) butane, 1, 3, 5-trimethyl -2, 4, 6-tris (3, 5-G tertiary butyl-4-hydroxybenzyl) benzene, tetrakis (methylene-3-(3', 5'-G tertiary butyl-4'-hydroxyphenyl propionate) methane [ -- that is pen TAERISURI methyl-tetrakis (3-(3, 5-G tertiary butyl-4-hydroxyphenyl propionate)] --) A triethylene glycol screw (3-(3-tertiary butyl-4-hydroxy-5-methylphenyl) propionate), Alkylation phenol system compounds, such as TOKOFE Norian; 6-(4-hydroxy - 3, 3rd butylanilino of 5-G)-2, 4-bis-octylthio-1,3,5-triazine, 6-(4-hydroxy - 3, 5-dimethyl ANIRINO)-2, 4-bis-octylthio-1,3,5-triazine, 6-(the 4-hydroxy-3-methyl-5-3rd butylanilino)-2, 4-bis-octylthio-1,3,5-triazine, 2-octylthio -4, 6-screw -(3, 5-G tertiary butyl-4-oxy-ANIRINO)- TO, such as 1,3,5-triazine [0035] If it is the object usually used in a general resin industry as a Lynn system antioxidant, there will be no exceptional limitation. For example, triphenyl phosphite, diphenyl isodecyl phosphite, Phenyl di-isodecyl phosphite, tris (nonylphenyl) phosphite, Tris (dinonylphenyl) phosphite, tris (2, 3rd butylphenyl of 4-G) phosphite, Tris (2-tertiary butyl-4-methylphenyl) phosphite, tris (cyclohexyl phenyl) phosphite, 2,2-methylene bis (4, 3rd butylphenyl of 6-G) octylphosphite, 9, 10-dihydro - 9-OKISA-10-phospha phenanthrene-10-oxide, 10-(3, 5-G tertiary butyl-4-hydroxybenzyl)-9, 10-dihydro - 9-OKISA-10-phospha phenanthrene-10-oxide, Mono-phosphite system compounds, such as a 10-DESHIROKISHI -9 and 10-dihydro-9-OKISA-10-phospha phenanthrene; 4 and 4'-butylidenebis (3-methyl-6-3rd butylphenyl-G tridecyl phosphite), A 4 and 4'-isopropylidene-screw (phenyl-G alkyl (C12-C15) phosphite), A 4 and 4'-isopropylidene-screw (diphenyl monoalkyl (C12-C15) phosphite), 1, 1, 3-tris (the 2-methyl-4-G tridecyl phosphite-5-3rd butylphenyl) butane, Tetrakis (2, the 3rd butylphenyl of 4-G) -4, 4'-biphenylene diphosphite, Cyclic neopentane tetraethylbis (isodecyl phosphite), Cyclic neopentane tetraethylbis (nonylphenyl phosphite), Cyclic neopentane tetraethylbis (2, the 3rd butylphenyl phosphite of 4-G), Diphosphite system compounds, such as cyclic neopentane tetraethylbis (2, 4-dimethylphenyl phosphite) and cyclic neopentane tetraethylbis (2, the 3rd butylphenyl phosphite of 6-G), etc. are mentioned. Also in these, a mono-phosphite system compound is desirable and tris (nonylphenyl) phosphite, tris (dinonylphenyl) phosphite, especially tris (2, 3rd butylphenyl of 4-G) phosphite, etc. are desirable.

[0036] A sulfur system anti-oxidant can mention dilauryl 3, 3-thiodipropionate, dimyristyl 3, 3'-thiodipropionate, distearyl 3, 3-thiodipropionate, lauryl stearyl 3, 3-thiodipropionate, and pentaerythritol-tetrakis - (beta-laurylthio-propionate), 3, and 9-screw (2-dodecyl thio ethyl)-tetraoxaspiro [ 2, 4, 8, and 10-] [5, 5] undecane etc.

[0037] Although especially limitation will not be carried out if a lactone system antioxidant is a compound thing including lactone structure, the lactone compound of an aromatic series system is desirable. What has a benzo hula non frame also in this is more desirable, and the 3-aryl benzofuran-2-ON which it has in the side chain of a furan ring by making an aryl group into a substituent further is more desirable. 5 and 7-G tertiary butyl-3-(3, 4-G methylphenyl)-3H-benzofuran-2-ON can be raised as an example.

[0038] the loadings of an anti-oxidant [ on this invention and as opposed to an alicyclic structure content polymer ] -- the norbornene system polymer 100 weight section -- receiving -- respectively -- usually -- 0.0001 thru/or the 0.01 weight section -- desirable -- 0.0001 thru/or the 0.005 weight section -- it is the range of 0.0001 thru/or the 0.003 weight section more preferably. If too conversely few [ if there are too many loadings of the anti-oxidant in an alicyclic structure content polymer resin material, generating of particle may increase, and ], it may be inferior to the long term stability of a Plastic solid.

[0039] Although there will be no exceptional limit if it is generally used in resin industry about other

compounding agents, for example, an ultraviolet ray absorbent and/or light stabilizer, a plasticizer, a pigment and a near infrared ray absorbent, an antistatic agent, an alcoholic compound, etc. can be mentioned, for example. the compounding agent of these others is independent -- it is -- it can use combining two or more sorts, and the compounding agent is suitably chosen in the range which does not spoil the purpose of this invention.

[0040] The container of container this invention is characterized by for the inside of a container carrying out blow molding of the above-mentioned alicyclic structure content polymer resin material, and changing at least. Especially in this invention, before carrying out blow molding of the alicyclic structure content polymer resin material, by setting more preferably to 80 ppm or less 150 ppm or less of 100 ppm or less of volatile-matter residues which may volatilize below by  $T_g$  of this alicyclic structure content polymer resin of \*\* in a material, the minute projection which appears in the internal surface of the container by which blow molding was carried out decreases, and the container with which generating of particle is fully suppressed according to the effect is obtained. As a method of reducing the volatile-matter residue of an alicyclic structure content polymer resin material, although there is no limitation exceptionally, the method of heat-treatment and/or reduced pressure processing is effective, for example. Heat-treatment and/or reduced-pressure processing are the processings which remove the material which can serve as a gas at the time of the volatile matter, i.e., shaping, contained in resin, and are air, moisture, a residual monomer and oligomer (the oxygen, the nitrogen, carbon dioxide, etc.), the residual organic solvent, the compound itself and the resin, cracked gas of other compounds, etc. which are contained in resin as material which can serve as a gas at the time of shaping, for example. By removing them, surface [ by the generating gas which appears on the surface of mold goods / poor ] is reduced, and generating of the particle of a liquid which contacted can be reduced by raising surface smooth nature.

[0041] As a concrete method of heating and/or reduced pressure processing Although there is no exceptional limit, an alicyclic structure content polymer resin material The temperature requirement from \*\*40 degree C to  $T_g$ -5(degree-C) of alicyclic structure content polymer resin, It is below \*\* ( $T_g$ -5) of the method and \*\* alicyclic structure content polymer resin which are heated preferably for 1 hour or more 30 minutes or more in the temperature requirement of 50 degrees C - ( $T_g$ -5) \*\* preferably. The method of usually performing preferably reduced pressure (usually 500 or less mmHgs, preferably 200 or less mmHgs) processing 20 minutes or more 10 minutes or more etc. is mentioned. It is suitable for the alicyclic structure content polymer resin material which reduced these volatile-matter residue content to usually perform blow molding within 30 minutes preferably from the above-mentioned completion of processing promptly for less than 1 hour. In order to measure the volatile-matter residue which may volatilize below by  $T_g$  of the alicyclic structure polymer resin material which exists in an alicyclic structure content polymer resin material, it asks by deducting a part for the volatile loss by heating and/or reduced pressure processing beforehand the total amount of volatile matter of an alicyclic structure content polymer resin material after measurement \*\*\*\*\* first. The total amount of volatile matter is measured as follows. \*\* Carry out 10-50g precise weighing (Ag) of the alicyclic structure content polymer resin material into the weighing bottle which put in the desiccator filled up with silica gel for 24 hours or more, and measured weight beforehand. The weighing bottle of \*\*\*\* is left in 10 or less mmHgs in \*\* ( $T_g$ -5) of an alicyclic structure content polymer resin material for 24 hours in the vacuum dryer which carried out a temperature setup. \*\* Carry out precise weighing (Bg) after cooling radiationally in a desiccator the weighing bottle of \*\* picked out from the 24 hours after vacuum dryer for 10 minutes, and let the difference of the first weight (Ag) and the weight after vacuum processing (Bg) be the total amount of volatile matter which exists in resin. The total volatile-matter concentration: C is expressed with  $(A-B)/A$ . Next, how to ask for volatile loss [ by the thing to depend on heating and/or reduced pressure processing and to do for a volatile loss part ] is replacing the processing conditions of \*\* of the above-mentioned method with each heating and/or reduced pressure processing, and it asks by the same calculation method (D). A volatile-matter residue is calculated by (D-C).

[0042] before melting of shaping, or under melting -- heating -- and -- or the feature is to perform and carry out blow molding of the reduced pressure processing. although there be especially no limit about the Plastic solid acquire by perform blow molding , generally a container especially a liquid , and a solid-state be ask , but industrial equipments , such as a container into which food , drugs , a

chemical especially the drug solution for semiconductor manufacture , general industrial use components , etc. be put , a checking cel and a tube , a pipe which make surface smooth nature important , and a hose , the bumper for vehicles , lamp circumference components , the panel for an ornament , etc. be mention .

[0043] As a method of carrying out blow molding of the blow molding method alicyclic structure content polymer resin material, it can fabricate using methods, such as injection blow molding and direct blow molding, that what is necessary is just to follow a conventional method. In order to suppress generating of particle, direct blow molding is performed preferably. It becomes the factor which contact to the resin used as metal mold and a container inside takes place, and particle generates and is not desirable if injection molding is performed as a method except blow molding. Although blow molding conditions change also with the glass transition point of alicyclic structure content polymer resin, and fluidities, 100 degrees C - 350 degrees C of molding temperature are usually preferably fabricated at 120 degrees C - 300 degrees C and a temperature high 140 degrees C - 250 degrees C rather than the glass transition point of alicyclic structure content polymer resin. Although it will become easy to carry out precision shaping if a fluidity falls, and precision shaping becomes difficult and molding temperature is too too high conversely, although heat deterioration has little effect if molding temperature is too too low, deterioration of resin may start and faults, such as coloring and a fall on the strength, may arise in a cast. -150 degrees C - +10 degrees C of blow die temperatures are usually a -100 degrees C - 0 degree C temperature requirement preferably to Tg of alicyclic structure content polymer resin. It is the semantics which prevents mixing of a foreign matter and raises the yield of a product, as for the environment of blow molding, fabricating in a clean room is desirable, and it is desirable to use that from which the gas for blowing also removed the particle with the filter etc. beforehand. Especially in this invention, by carrying out blow molding of said alicyclic structure content polymer resin material, the high container of surface smooth nature is obtained and generating of particle can be suppressed. Although what is necessary is just to choose suitably the thickness of the inside which consists of an alicyclic structure content polymer resin material according to the purpose of use, the range of it is usually 0.1mm - 10mm preferably 0.01mm - 20mm.

[0044] Although there is no limitation exceptional except the container of this invention coming to carry out blow molding of the alicyclic structure content polymer resin material to an inside at least, the layer which consists of other resin materials may be prepared, for example in the outer layer of a container. As other resin materials, it is usually 70 % of the weight or more preferably 50% of the weight or more about the resin of others other than alicyclic structure content polymer resin. It contains 90% of the weight or more still more preferably.

[0045] As other resin, it is the same as that of instantiation of the resin of said others, and also in them, versatility is high, crystalline polymer, such as polyethylene and polypropylene with strong high reliability, polyethylene terephthalate, and a polyamide, is desirable, and the field of cost to high density polyethylene is more more desirable still. Other resin materials may blend an antioxidant and other compounding agents if needed in addition to resin besides the above. Instantiation of an antioxidant or other compounding agents is the same as that of the aforementioned thing, and the loadings are suitably chosen in the range which does not spoil the purpose of this invention. Although the thickness of the layer which consists of other resin materials should just be suitably examined according to the purpose of use, the range of it is usually 0.1 to 20mm preferably 30mm from 0.1mm.

[0046] That what is necessary is just to follow a conventional method, with a multilayer die, the manufacture method of a container of coming to prepare the layer which comes to carry out blow molding of the alicyclic structure content polymer resin material to an inside at least, and turns into an outer layer from other resin materials can carry out multilayer blow molding of an alicyclic structure content polymer resin material and the other resin materials, and can perform them. Multilayer blow conditions are the same as blow molding conditions in the first half. Although the capacity of the container of this invention is suitably chosen according to the purpose of use, it is usually 100,000ml [ 100ml to ] range preferably 200,000ml from 10ml.

[0047] The container of this invention With a pH of three or less aqueous acids, a with a pH of ten or more alkaline aqueous solution, It is filled up with at least one kind of aqueous solution chosen from

the group which consists of a hydrogen peroxide. And the yield of the particle under 23-degree-C environment and 24-hour standing conditions It is the yield of particle 0.2 micrometers [ per two ] or less 1cm of internal-surface products which a container and an aqueous solution contact, and 0.4 or less counts(es) are 0.5 counts/ml [ less than ] usually 0.3 counts(es)/less than ml more preferably.

Although the container of this invention can be effectively used in semiconductor down stream processing which uses the aqueous solution concerned alternatively and is suitable if it seems that a particle yield satisfies the above-mentioned requirements when [ of the three above-mentioned kinds of aqueous solutions ] you make it filled up with any one kind of aqueous solution at least Also when you make it filled up with as many kinds as possible of aqueous solutions, since that with which a particle yield fills the above-mentioned requirements can be used by more semiconductor down stream processing, it is desirable. Also when filled up with all three kinds of aqueous solutions, if the yield of particle satisfies the above-mentioned requirements, it is the most desirable.

[0048] For measurement of particle, it measures using a particle counter. In this invention, the above-mentioned aqueous solution of the amount of arbitration is put into the created container, and particle is measured, after leaving the container at 23 degrees C for 24 hours. In order to measure particle correctly, the high thing of an air cleanliness class of the circumference environment at the time of putting an aqueous solution into a container and the time of measuring particle is desirable beforehand. About with a pH of three or less aqueous acids, if it is the aqueous solution in which three or less pH is shown by the measuring method of a pH meter, the pH indicator paper, or a pH indicator Although there is especially no limit about the class of acid, and concentration, for example A sulfuric acid, A sulfurous acid, a nitric acid, a hydrochloric acid, a hypochlorous acid, a chloric acid, perchloric acid, hydrogen fluoride, It is obtained by inorganic [ , such as a hydrogen bromide, hydrogen iodide, permanganic acid, phosphoric acid, a chromic acid, a way acid, formic acid, an acetic acid, oxalic acid, a tartaric acid, a citric acid, and a phenol, ] or an organic acid being independent, or adjusting the mixed aqueous solution to concentration which is set to three or less pH. Generally 80% of the weight or more of a sulfuric acid, 50% of the weight or more of a nitric acid, 30% of the weight or more of a hydrochloric acid, 40% of the weight or more of a hydrofluoric acid, etc. are used as a drug solution for semiconductor manufacture in these. Although there will be especially no limit about the class of alkali, and concentration if a with a pH of ten or more alkaline aqueous solution is an aqueous solution in which ten or more pH is shown by the measuring method of a pH meter or the pH indicator paper, it is obtained, for example by adjusting aqueous solutions been [ aqueous solutions / it ] independent or mixed, such as ammonia, a sodium hydroxide, a potassium hydroxide, a barium hydroxide, and a calcium hydroxide, to concentration which is set to ten or more pH. Generally 30% of the weight or more of aqueous ammonia etc. is used as a drug solution for semiconductor manufacture in these. Especially about hydrogen peroxide solution, 10 % of the weight or more is used.

[0049]

[Example] Although the example of manufacture, an example, and the example of a comparison are given and this invention is explained more concretely hereafter, the range of this invention is not limited to these examples. In these examples, the [section] and the [weight section] are weight criteria, as long as there is no notice especially. Moreover, the measuring method of various physical properties is as follows.

- [0050] (1) Tg was measured with the differential scanning calorimeter (DSC law).
- (2) Especially molecular weight was measured as a polyisoprene reduced property measured with the gel permeation chromatography (GPC) which uses a cyclohexane as a solvent, unless it indicated.
- (3) A melt flow rate is JIS. By K6719, it measured by the temperature of 280 degrees C, and load 2.16kgf.
- (4) The volatile-matter residue of resin measured only the material which performed heating and/or reduced pressure processing. According to the written-among the text method, the weighing bottle of 50 cc of glass inner capacity was used for the measuring method, and it measured and computed weight change which is about 20g of resin materials.
- (5) The smooth nature [1] of an internal surface broke the container perpendicularly in one half, observed the internal surface visually, and checked whether the surface would have the defect of a void with a diameter of 30 micrometers, air bubbles, etc. These evaluation O ... The defect of an

internal surface is with a 1000cm surface area [ one place / surface area / or less 2 ] thing \*\*... The defect of an internal surface is thing [ of 2 ] x 2, or three place / surface area of 1000cm... The defect of an internal surface Four place / table The smooth nature [2] of a with a 1000cm area [ or less 2 ] thing (6) internal surface measured 5mm of inner circumference side wall sections of the arbitration of an internal surface with the contact process surface roughness plan (resolution of 0.02 micrometers), and expressed surface roughness Ra.

(7) The particle of an aqueous solution was measured at the particle counter (Rion KL- 26). In addition, each of restoration environment of an aqueous solution and measurement environment of \*\* particle was carried out in 100 or more air cleanliness class:classes.

[0051] (Example 1 of reference) Under nitrogen-gas-atmosphere mind in the cyclohexane 500 weight section which dehydrated Keeping at 45 degrees C, after putting the 1-hexene 0.56 weight section, the dibutyl ether 0.11 weight section, and the triisobutylaluminum 0.22 weight section into a reactor at a room temperature and mixing 8-methyl-tetracyclo [4. Over 2 hours, it added continuously and the polymerization of 4.0.12 and the 5 . 17, 10] dodeca-3-en 200 weight section, and 0.70 % of the weight [ of tungsten hexachlorides ] toluene solution 30 weight section was carried out. It transports to the hydrogenation reactor of pressure-proofing of polymerization reaction mixture after polymerization reaction termination, the diatomaceous earth support nickel catalyst (product made from Nissan gar DORA; G-96D, 58 %.of the weight of rates of nickel support) 10 weight section is added, and they are 180 degrees C and hydrogen pressure 45 kgf/cm<sup>2</sup>. It was made to react for 10 hours. It filtered with the filter which used diatomaceous earth as filter aid for this solution, and offered the wire gauze made from stainless steel, and the catalyst was removed. The bottom of stirring in the isopropyl alcohol of the 3000 weight sections is filled with the obtained reaction solution, and the hydrogenation object was settled, and it carried out the \*\* exception and collected. Furthermore, after washing in the acetone 500 weight section, it dried for 48 hours in 1 or less mmHg and the vacuum drier set as 100 degrees C, and the hydrogenation object 190 weight section of a norbornene system ring-opening-polymerization object was obtained.

(Polymer physical properties) For the rate of principal chain hydrogenation of the obtained ring-opening-polymerization object hydrogenation object, number average molecular weight (Mn) was [ 41,200 and the molecular weight distribution (Mw/Mn) of 20,400 and weight average molecular weight (Mw) ] 2.02 99.9%. The melt flow rates in 280 degrees C were 20g/10min., Tg was 140 degrees C and specific gravity was 1.01.

[0052] (Example 2 of reference) In the ring-opening-polymerization object hydrogenation object 100 section obtained in the example 1 of reference The 0.002 sections of Ciba-Geigy IRUGA NOx 1010 (pentaerythritol tetrakis [3-(3, 5- G tertiary butyl-4-hydroxyphenyl) propionate]) are added as an anti-oxidant. It kneaded, extruded and pelletized with the biaxial extruder (TEM[ by Toshiba Machine Co., Ltd. ]-35B, 37mm [ of diameters of a screw ], ratio-of-length-to-diameter=32, screw-speed 250rpm, resin temperature [ of 240 degrees C ], and feed rate 10kg/hour). The total amount of volatile matter of the obtained pellet was 300 ppm.

[0053] (Example 3 of reference) In the ring-opening-polymerization object hydrogenation object 100 section obtained in the example 1 of reference, the 0.005 sections of Ciba-Geigy IRUGA NOx 1010 were added as an anti-oxidant, and it pelletized by the same method as the example 2 of reference in it. The total amount of volatile matter of the obtained pellet was 300 ppm.

[0054] (Example 4 of reference) In the ring-opening-polymerization object hydrogenation object 100 section obtained in the example 1 of reference, the 0.05 sections of Ciba-Geigy IRUGA NOx 1010 were added as an anti-oxidant, and it pelletized by the same method as the example 2 of reference in it. The total amount of volatile matter of the obtained pellet was 310 ppm.

[0055] (Example 1) The blow container with a thickness of 0.8mm of the cylindrical shape which shows the resin material obtained in the example 2 of reference to drawing 1 of the bore of 140mm and height [ of 350mm ] \*\* with the direct-blow-molding machine set as 50 degrees C all over the clean room of a class 100 whenever [ diameter of cylinder 30mmphi, cylinder-temperature / of 270 degrees C /, dice temperature / of 260 degrees C /, and blow mold temperature ] after carrying out at 110 degrees C and heat-treating in air for 3 hours was It was 70 ppm when the volatile-matter residue was measured on 110 degrees C and processing conditions in 3 hours. The result of the smooth nature of the internal surface of the obtained blow container is shown in a table 1. After

filling up these eight bottles with 1000ml of ultrapure water and washing a wall, it filled up with a nitric acid (67.5 % of the weight; pH 1-2), a hydrofluoric acid (50 % of the weight; pH 1-2), aqueous ammonia (35 % of the weight; pH 11-12), and two hydrogen peroxide solution (35 % of the weight) at a time, respectively, and sealed using the screw cap by which injection molding was carried out from the pellet of the example 2 of reference. The yield of the particle immediately after restoration of a drug solution and of 24 hours after was measured. A result is shown in a table 1. Generating of particle had very little all and they have checked that it was what is not made to increase particle but can maintain these aqueous solutions at clarification.

[0056] (Example 2) The blow container as shown in drawing 1 by the same method as an example 1 was created except having processed the resin material once heated at 110 degrees C under reduced pressure of 50mmHg for 1 hour instead of heat-treating in air using the resin material of the example 2 of reference. It was 40 ppm when the volatile-matter residue was measured on the same conditions as this method. The smooth nature of the internal surface of this blow container and the measurement result of the yield of particle are shown in a table 1.

[0057] (Example 3) The blow container was created by the same method as an example 1 except having used the resin material of the example 3 of reference. The smooth nature of the internal surface of this blow container and the measurement result of the yield of particle are shown in a table 1.

[0058] Super-high density polyethylene (HDPE; Showa Denko, show REXX S5003BH) and the resin of the example 2 of reference are used. (Example 4) The making machine which has two possible cylinders of two-layer blow molding for a making machine is used. HDPE was extruded at 190 degrees C of cylinder temperatures to the outer layer side, the resin material of the example 2 of reference was extruded at 270 degrees C of cylinder temperatures to the inner layer side, and the blow container was created by the same method as an example 1 except having made dice temperature for co-extrusions into 260 degrees C. The smooth nature of the internal surface of this blow container and the measurement result of the yield of particle are shown in a table 1.

[0059] (Example 5) The blow container was created by the same method as an example 1 except having changed the resin material into the thing of the example 4 of reference. The smooth nature of the internal surface of this blow container and the measurement result of the yield of particle are shown in a table 1.

[0060] (Example 6) The blow container was created by the same method as an example 3 except having not heat-treated. The smooth nature of the internal surface of this blow container and the measurement result of the yield of particle are shown in a table 1.

[0061] (Example 7) The blow container was created by the same method as an example 5 except having not heat-treated. The smooth nature of the internal surface of this blow container and the measurement result of the yield of particle are shown in a table 1.

[0062] (Example 1 of a comparison) It was made HDPE which used the resin material in the example 4, and 190 degrees C of cylinder temperatures were created with the making machine of an example 1, and the blow container made from HDPE of a monolayer was created at the dice temperature of 210 degrees C. The smooth nature of the internal surface of this blow container and the measurement result of the yield of particle are shown in a table 1.

[0063] (Example 2 of a comparison) It replaced with the direct-blow-molding machine used in the example 1, and the bore of 139.5mm of a base as shown in drawing 2 using the resin material of the example 4 of reference, the bore of 140.0mm of the regio oralis, and the container of a cylindrical shape with a height of 300mm were created using the injection molding machine (NISSEI PLASTIC INDUSTRIAL, FS-80, 80t of mold clamp force, diameter of cylinder 32mmphi) which set the making machine as the cylinder temperature of 270 degrees C, The smooth nature of an internal surface and the yield of particle were measured for this container by the same method as an example 1. A result is shown in a table 1.

[0064]

[A table 1]

実験 番号	酸化防止 剤 重量 g	加熱または 凍結処理	内表面の平滑性 目視 Ra μm	バーティカル (counts/ml)		アーモニア水 表面水素酸 24時間後		過酸化水素水 表面水素酸 24時間後	
				直接直後	24時間後	直接直後	24時間後	直接直後	24時間後
実施例1	0.002	110°C、3時間 凍結、110°C、1時間	○	0.05 0.05	0.06 0.06	0.01 0.12	0.04 0.04	0.05 0.05	0.05 0.05
実施例2	0.002	110°C、3時間 凍結、110°C、3時間	○○○○○	0.06 0.06	0.3	0.04 0.16	0.04 0.05	0.04 0.05	0.08 0.09
実施例3	0.005	110°C、3時間 凍結、110°C、3時間	○○○○○	0.05 0.06	0.13 0.38	0.04 0.04	0.05 0.23	0.05 0.07	0.07 0.08
実施例4	0.002	110°C、3時間 凍結、110°C、3時間	△△△△△	0.08 0.08	0.06 0.43	0.04 0.04	0.29 0.33	0.05 0.05	0.09 0.12
実施例5	0.05	110°C、3時間 凍結、110°C、3時間	△△△△△	0.07 0.06	0.45 0.45	0.04 0.04	0.33 0.58	0.05 0.05	0.09 0.08
実施例6	0.005	なし なし なし なし なし	△△○×	0.08 0.06 0.04	0.06 0.06 0.04	0.04 0.04	0.29 0.58	0.05 0.05	0.1 0.12
実施例7	0.05	なし なし なし なし	△△○×	0.08 0.06 0.04	0.06 0.06 0.04	0.04 0.04	0.33 0.68	0.05 0.05	0.09 0.09
比較例1	0.05	高密度PEチップ	△△△△△	0.04	0.04	0.04	0.04	0.05	0.05
比較例2	0.05	PEチップ	○○○○○	0.04	0.04	0.04	0.04	0.05	0.05

\* 酸化防止剤量(重量部)は樹脂材料100重量部に対する値

#### [0065]

[Effect of the Invention] According to this invention, since there is little generating of the particle from the inside of the container itself, in storage of drug solutions for semiconductor manufacture, such as with a pH of three or less aqueous acids, a with a pH of ten or more alkaline aqueous solution, or hydrogen peroxide solution, and conveyance, the blow container which can hold the cleanliness of this drug solution is offered especially. Moreover, the blow molding object with which surface smooth nature has been improved by performing specific processing in the charge of shaping material before blow molding, and its manufacture method are offered.

#### [0066]

[Translation done.]